REU/RET/INT Macro Site: Structure Property Correlations across Micro to Nano Length Scales, DMR-0139081 & INT-0224929

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• Our macro site has involved participation of ***96*** *REU students* (***31*** *female,* ***27*** *minority,* ***67*** *non-GT)* representing ***15*** *majors* from ***41*** *institutions* (1***6*** *minority/UG colleges)* mentored by ***33*** *faculty* from ***8*** *different schools* at Georgia Tech

• *It has also involved participation of 29 teachers from Atlanta area schools with 11 teachers from schools with >97% minority population*

• ***Ten REU*** *students and* ***five RET*** *teachers have participated in International Research Experience at institutions in Southeast Asia.*

REU student at an international research experience site at Tsinghua Univ., China

RET teacher at an international site at Mikkei High School in Tsukuba, Japan

Faculty mentor presenting certificate to REU student at end-of-program ceremony

Demographic and statistical information through 6-year history of REU site at Georgia Institute of Technology

REU YEAR	1999	2000	2001	2002	2003	2004	TOTAL
# of Applicants	56	54	58	94	110	97	78 (average)
# of Participants* {GT} (Sen, Jun, Soph)	14{5} (7,3,4)	13{5} (2,7,4)	14{4} (4,6,4)	17{4} (11,3,3)	20{5} (7, 9,4)	18{6} (7,9,2)	96{29} (38,37,21)
# of Majors	8	7	4	6	6	7	15
# of Minorities	5	4	6	3	4	5	27
# of Females	4	5	5	7	5	5	31
Average GPA	3.49	3.40	3.46	3.62	3.675	3.724	3.56 (average)
# in Grad School or interested	10	7	11	11	15	15	69
Institutions Represented	11	8	9	13	15	12	42
# Faculty (Disciplines)	15 (5)	13 (6)	13 (3)	15(4)	17 (6)	18(4)	33 (8)
Stipend Awarded	$4,000	$4,200	$4,600	$4,800	$5,000	$5,000	$4,267 (ave)

No. of participants listed for each year is more than that were initially included in our proposed budget (i.e., 12 per year for 1999-2001 and 15 per year for 2002-2004).* ***Participation of additional students was facilitated by funds provided by faculty mentors from other grants.*

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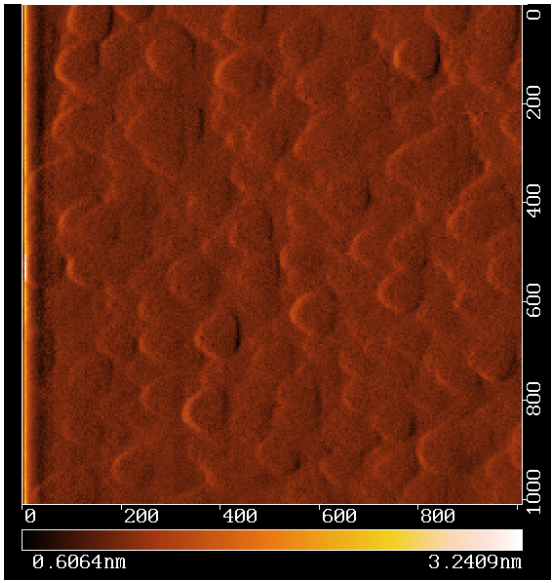
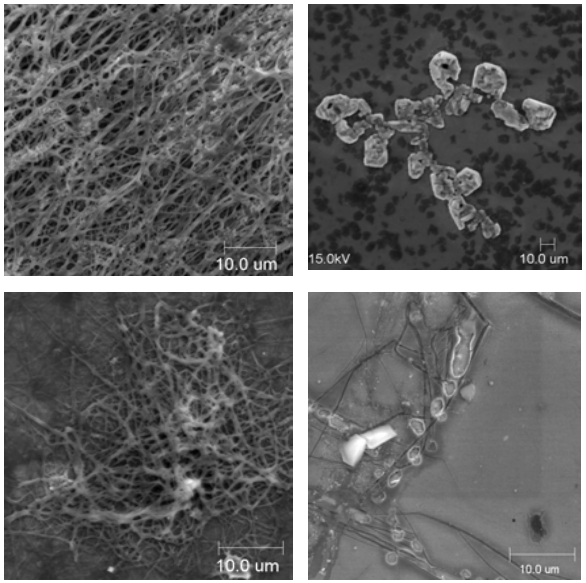
REU student Clara Cho from Olin College, MA, studied compositional spread of AlN thin films on 6H-SiC using combinatorial chemistry at Tokyo Institute of Technology



AFM imaging showed islands of SiO_2 oxide islands on film surface, possibly due to defects in deposition process. She also performed XRD rocking curve analysis which showed that AlN film was grown with (0002) orientation.

REU student Melanie Andara from Florida International Univ., studied hemocompatibility of DLC-composite films. She used SEM analysis to characterize events of blood activation on DLC films



Her study demonstrated that the electrochemical interaction between Plasma Rich Platelet and surface of coatings produces clotting. DLC-Ti and DLC-Ag have higher charge transfer than pure DLC, DLC-CaO-SiO2 and DLC-GaN.

REU student Angela Camp, from Spelman College, Atlanta, GA, studied synthesis of amphiphilic heterocycles consisting of hydrophobic polystyrene (PS) and polyoxyethylene (POE) at GaTech

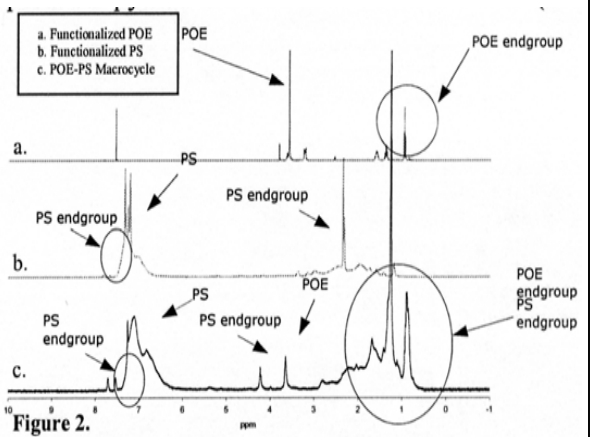


Figure 2.

She maximized PS-POE cyclic product yield by self-assembly method in which ionic functional groups acted as templates to minimize side reactions. She used ^{1}H-NMR, Gel Permeation Chromatography, and diffusion ordered NMR spectroscopy to confrim synthesis of PS-POE polymer and confirm functionalization of PS and POE

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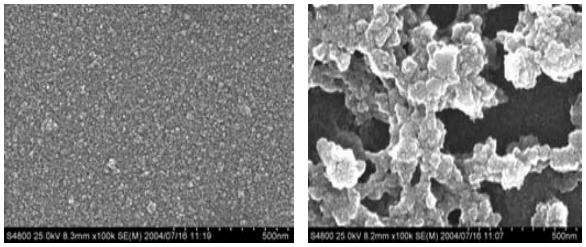
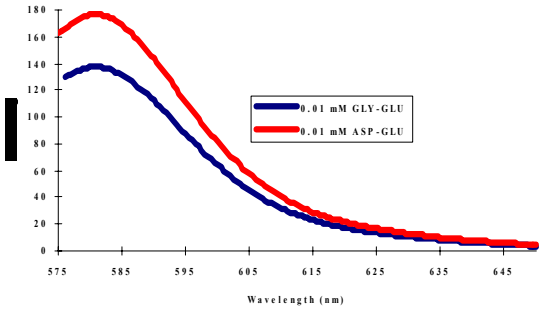
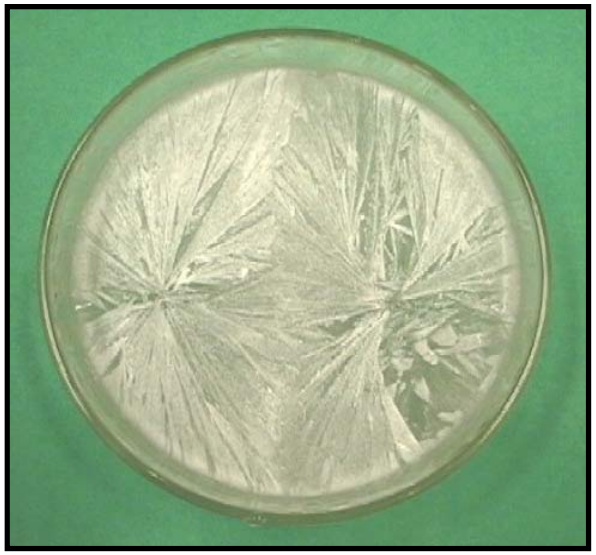
REU student Jimmy Stokes from Univ of Minnesota, studied electro-static absorbtion of Cytochrome c onto a solid ZrO_2 substrate without denaturing the protein functionality, at NIMS, Tsukuba, Japan.





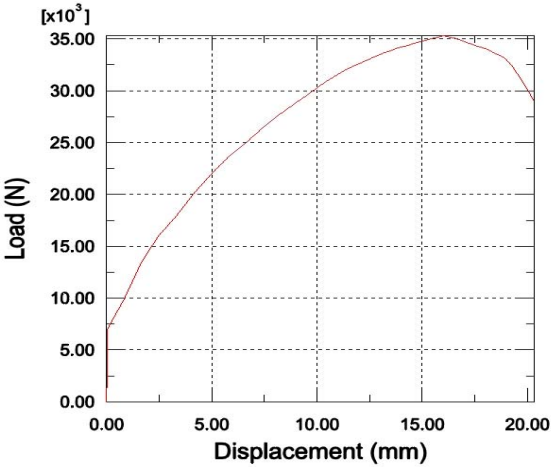
UV-VIS spectra and fluorescence spectroscopy analysis verified that ion exchange occurs between the dipeptide and SRB. The results illustrate that ion exchange between peptide and Cytochrome c occurs more naturally with more negative peptide (ASP-GLU).

RET teacher Kevin Hursyz from Woodward Academy in Atlanta developed a module to demonstrate heterogeneous solidification using single and two crystal seeds to innoculate solid phases in a solution of sodium acetate trihydrate



His module includes extension of this demonstration to involve his students in designing new architec-tures and applications for production of "hot-packs" using sodium acetate trihydrate solution

RET teacher Steven Thedford from Redan High School, in Atlanta, GA, developed a module on "Virtual Tensile Testing of Materials," using Finite Element modeling



Load vs. Displacement plot for Copper

His module involves generating load-displacement data obtained from FEM analysis to compute stress-strain values as in an actual experiment. It also involves producing true-stress versus true-strain plots and illustrating work hardening effects of different materials